

**CLAIMS**

1. DNA coding for a chimeric receptor containing two or more independent polypeptide chains each of said chains comprising in a N- to C-terminus sequence:
- (1) an extracellular ligand association domain;
- (2) a transmembrane domain; and
- (3) one or more intracellular domains;
- provided that at least two of said domains in one chain are not naturally fused to each other.
2. DNA according to Claim 1 wherein each extracellular ligand association domain coded for is an antibody variable region ( $V_H$  or  $V_L$ ) domain, a T-cell receptor variable region domain ( $TCR\alpha$ ,  $TCR\beta$ ,  $TCR\gamma$ ,  $TCR\delta$ ),  $CD8\alpha$ ,  $CD8\beta$ ,  $CD11a$ ,  $CD11b$ ,  $CD11c$ ,  $CD18$ ,  $CD29$ ,  $CD49a$ ,  $CD49b$ ,  $CD49c$ ,  $CD49d$ ,  $CD49e$ ,  $CD49f$ ,  $CD61$ ,  $CD41$  or  $CD51$  chain or a fragment thereof.
3. DNA according to Claim 2 wherein each association domain is structurally different to each other.
4. DNA according to Claim 1 wherein the ligand association domains of the chimeric receptor coded for are a  $V_H$  domain paired with a  $V_L$  domain, two or more  $TCR\alpha$ ,  $TCR\beta$ ,  $TCR\gamma$ , and/or  $TCR\delta$  domains, a  $CD8\alpha$  or  $\beta$  homo- or heterodimer,  $CD18$  paired with one or more of  $CD11a$ ,  $b$ , or  $c$ ,  $CD29$  paired with one or more of  $CD49a$ ,  $b$ ,  $c$ ,  $d$ ,  $e$ , or  $f$ , and  $CD61$  paired with  $CD41c$  and/or  $CD51$ .
5. DNA according to ~~any of the preceding Claims~~ <sup>Claim 1</sup> wherein each intracellular domain coded for is a naturally occurring polypeptide signalling sequence.
6. DNA according to Claim 5 wherein each signalling sequence is all or part of the zeta, eta or epsilon chain derived from the T-cell receptor;  $CD28$ ;  $CD4$ ;  $CD8$ ; the  $\gamma$  chain of a Fc receptor; a signalling component from a cytokine receptor, a colony stimulating factor

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receptor, a tyrosine kinase and binding domains thereof; or an adhesion molecule.

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- 5 7. DNA according to ~~any one of Claims 1 to 6~~ <sup>Claim 1</sup> wherein the transmembrane domain coded for is an oligo- or polypeptide derived from all or part of the alpha, beta or zeta chain of the T-cell receptor, CD28, CD8, CD4, CD3 $\epsilon$ , CD45 and members of the tetraspan family, a cytokine receptor, or a colony stimulating factor receptor.
- 10 8. DNA according to ~~any one of Claims 1 to 7~~ <sup>Claim 1</sup> wherein each independent polypeptide chain coded for additionally contains a spacer domain positioned between the ligand association domain and the transmembrane domain.
- 15 9. DNA according to Claim 8 wherein each spacer domain is a polypeptide comprising 20 to 100 amino acids.
- 20 10. DNA according to ~~any one of Claims 1 to 9~~ <sup>Claim 1</sup> wherein each independent polypeptide chain coded for additionally has a secretion signal sequence attached to the N-terminus of the association domain of each chain.
- 25 11. DNA according to ~~any of the preceding Claims~~ <sup>Claim 1</sup> wherein the chimeric receptor coded for has two independent polypeptide chains.
- 30 12. DNA according to Claim 11 wherein one polypeptide chain has a ligand association domain which is a V<sub>H</sub> domain or a fragment thereof, and the other has a ligand association domain which is a V<sub>L</sub> domain or a fragment thereof.
- 35 13. DNA according to ~~any one of Claims 1 to 12~~ <sup>Claim 1</sup> in association with a carrier.
14. DNA according to Claim 13 wherein the carrier is a viral vector, a liposomal vector, a cationic lipid or an antibody.

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15. DNA according to Claim 13 wherein the carrier is a targeted carrier.

16. DNA according to ~~any one of Claims 1 to 15~~ which is located on a plasmid. *Claim 1*

17. Plasmid pHMF374 as described in Figure 3 herein.

18. An effector cell containing DNA or a plasmid according to ~~any one of Claims 1 to 17~~. *Claim 1*

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